ENVIRONMENTAL IMPACT ASSESSMENT FOR THE PROPOSED HUMANSRUS SOLAR 3 POWER PLANT AND ASSOCIATED GRID CONNECTION INFRASTRUCTURE, HUMANSRUS, NORTHERN CAPE:

FAUNA & FLORA SPECIALIST IMPACT ASSESMENT REPORT

PRODUCED FOR CAPE EAPRAC

ON BEHALF OF HUMANSRUS SOLAR 3 (PTY) LTD.

BY

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April 2016

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DECLARATION OF CONSULTANTS' INDEPENDENCE

- I Simon Todd, as the appointed independent specialist hereby declare that I:
- act/ed as the independent specialist in this application;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- have and will not have no vested interest in the proposed activity proceeding;
- have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2010 and any specific environmental management Act;
- am fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 12 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- have provided the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of GN No. R. 982.

Note: The terms of reference must be attached.

Simon Todd Pr.Sci.Nat 400425/11.
May 2016

EXECUTIVE SUMMARY

Humansrus Solar 3 (Pty) Ltd is proposing the establishment of a commercial solar energy facility of 75MW near Copperton on Farm 147, Humansrus. As part of the required Environmental Impact Assessment (EIA) process, This Ecological Specialist Assessment Report forms part of the required EIA process for the development, and details the ecological characteristics of the site and provides an assessment of the likely ecological impacts associated with the development of the site as a solar energy facility. Impacts are assessed for the preconstruction, construction, operation and decommissioning phases of the development.

Two vegetation types occur within the site, Bushmanland Arid Grassland in the north-east and Bushmanland Basin Shrubland in the south west. These are both very extensive vegetation types that have been hardly impacted by transformation and are classified as Least Threatened. Consequently, these are not considered sensitive vegetation types and have a low abundance of species of conservation concern.

No features of very high sensitivity were identified within the Humansrus Solar 3 site. The majority of the site consists of low shrubland or grassy shrubland of moderate to low sensitivity with few species or habitats of conservation present. Although a number of protected species or species of conservation concern have been confirmed present in the broader area, the abundance of these within the site is low and there do not appear to be any protected trees within the site at all. In terms of fauna, the major impacts associated with the development of the site would be habitat loss and potentially some disruption of landscape connectivity for fauna.

The major impacts associated with the development of a solar energy facility at the site, would be local habitat loss and the disruption of landscape connectivity. As there are a number of other approved and proposed renewable energy projects in the area, the potential for cumulative impacts is high. However, the total extent of habitat loss in the area to date is less than 500ha and this is not considered highly significant in context of the surrounding landscape which is still largely intact. In addition, it is not likely that the affected area is highly significant for faunal movement or migration.

There are no impacts that are likely to be associated with the development of the Humansrus Solar 3 project that cannot be mitigated to a low level and as a result, the site is considered to be a favourable location for the development. A summary assessment of the different impacts associated with the development is provided below and indicates that the largest proportion of impact associated with the development would occur at the construction stage, due the disturbance of fauna and loss or transformation of vegetation that will occur at this stage.

Summary table of the impacts likely to be associated with the development of the Humansrus Solar 3 project.

Phase & Impact	Without Mitigation	With Mitigation
Planning & Construction		
Impacts on vegetation and listed or protected plant species resulting from construction activities	Medium Negative	Medium-Low Negative

Direct Faunal Impacts During Construction	Medium Negative	Medium-Low Negative
Soil Erosion Risk During Construction	Medium-Low Negative	Low Negative
Operation		
Alien Plant Invasion Risk During Operation	Medium Negative	Low Negative
Soil Erosion Risk During Operation	Medium Negative	Low Negative
Faunal impacts during operation:	Medium-Low Negative	Low-Negative
Cumulative Impacts		
Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat	Medium-Low Negative	Low Negative

1 INTRODUCTION

Humansrus Solar 3 (Pty) Ltd. is proposing the establishment of a PV and/or concentrated PV plant with fixed, single or double axis tracking technology. The proposed site is located near Copperton on Farm 147, Humansrus with a total farm area of 4769 ha. Within the property, an area of about 852 ha was identified for study in the Scoping Study, within which two development alternatives for consideration in the current EIA have been located.

As part of the above EIA process, this ecological specialist study details the ecological characteristics of the site and provides an assessment of the likely ecological impacts associated with the development of the site as a solar energy facility. Potential impacts on the fauna and flora of the site are identified and assessed for the preconstruction, construction, operation, and decommissioning phases of the development for the solar facility. A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely impact of the development, which should be included in the EMPr for the development. The full scope of study is detailed below.

1.1 SCOPE OF STUDY

The scope of the study includes the following activities

- a description of the environment that may be affected by the activity and the manner in which the environment may be affected by the proposed project
- a description and evaluation of environmental issues and potential impacts (incl. using direct, indirect and cumulative impacts) that have been identified
- a statement regarding the potential significance of the identified issues based on the evaluation of the issues/impacts
- an indication of the methodology used in determining the significance of potential environmental impacts
- an assessment of the significance of direct indirect and cumulative impacts in terms of the following criteria :
    - the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
    - the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
    - the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0-5 years), medium-term (5- 15 years), long-term (> 15 years, where the impact will cease after the operational life of the activity) or permanent
    - the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood) probable (distinct possibility), highly probable (most likely), or definite (Impact will occur regardless of any preventable measures)
    - the severity/beneficial scale indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit with no real alternative to achieving this benefit) severe/beneficial (long-term impact that could

be mitigated/long-term benefit) moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight or have no effect
    - the significance which shall be determined through a synthesis of the characteristics described above and can be assessed as low medium or high
    - the status which will be described as either positive, negative or neutral
    - the degree to which the impact can be reversed
    - the degree to which the impact may cause irreplaceable loss of resources
    - the degree to which the impact can be mitigated

- a description and comparative assessment of all alternatives
- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Programme (EMPr)
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- a description of any assumptions uncertainties and gaps in knowledge
- an environmental impact statement which contains :
    - a summary of the key findings of the environmental impact assessment;
    - an assessment of the positive and negative implications of the proposed activity;
    - a comparative assessment of the positive and negative implications of identified alternatives

1.2 ASSESSMENT APPROACH & PHILOSOPHY

The assessment will be conducted according to the EIA Regulations, published by the Department of Environmental Affairs (2014) as well as within the best-practice guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers et al. (2005).

This includes adherence to the following broad principles:

- That a precautionary and risk-averse approach be adopted towards projects which may result in substantial detrimental impacts on biodiversity and ecosystems, especially the irreversible loss of habitat and ecological functioning in threatened ecosystems or designated sensitive areas: i.e. Critical Biodiversity Areas (as identified by systematic conservation plans, Biodiversity Sector Plans or Bioregional Plans) and Freshwater Ecosystem Priority Areas.

- Demonstrate how the proponent intends complying with the principles contained in section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended (NEMA), which, amongst other things, indicates that environmental management should.

    - In order of priority aim to: avoid, minimise or remedy disturbance of ecosystems and loss of biodiversity;
    - Avoid degradation of the environment;
    - Avoid jeopardising ecosystem integrity;

- Pursue the best practicable environmental option by means of integrated environmental management;
- Protect the environment as the people's common heritage;
- Control and minimise environmental damage; and
- Pay specific attention to management and planning procedures pertaining to sensitive, vulnerable, highly dynamic or stressed ecosystems.

These principles serve as guidelines for all decision-making concerning matters that may affect the environment. As such, it is incumbent upon the proponent to show how proposed activities would comply with these principles and thereby contribute towards the achievement of sustainable development as defined by the NEMA.

In order to adhere to the above principles and best-practice guidelines, the following approach forms the basis for the study approach and assessment philosophy:
The study will include data searches, desktop studies, site walkovers / field survey of the property and baseline data collection, describing:

- A description of the broad ecological characteristics of the site and its surrounds in terms of any mapped spatial components of ecological processes and/or patchiness, patch size, relative isolation of patches, connectivity, corridors, disturbance regimes, ecotones, buffering, viability, etc.

In terms of **pattern**, the following will be identified or described:

Community and ecosystem level

- The main vegetation type, its aerial extent and interaction with neighbouring types, soils or topography;
- Threatened or vulnerable ecosystems (*cf. SA vegetation map/National Spatial Biodiversity Assessment, fine-scale systematic conservation plans, etc*).

Species level

- Red Data Book species (giving location if possible using GPS)
- The viability of an estimated population size of the RDB species that are present (include the degree of confidence in prediction based on availability of information and specialist knowledge, i.e. High=70-100% confident, Medium 40-70% confident, low 0-40% confident)
- The likelihood of other RDB species, or species of conservation concern, occurring in the vicinity (include degree of confidence).

Fauna

- Describe and assess the terrestrial fauna present in the area that will be affected by the proposed development.
- Conduct a faunal assessment that can be integrated into the ecological study.
- Describe the existing impacts of current land use as they affect the fauna.
- Clarify species of special concern (SSC) and that are known to be:
    - endemic to the region;

- that are considered to be of conservational concern;
- that are in commercial trade (CITES listed species);
- or, are of cultural significance.

- Provide monitoring requirements as input into the Environmental Management Plan (EMP) for faunal related issues.

Other pattern issues

- Any significant landscape features or rare or important vegetation associations such as seasonal wetlands, alluvium, seeps, quartz patches or salt marshes in the vicinity.
- The extent of alien plant cover of the site, and whether the infestation is the result of prior soil disturbance such as ploughing or quarrying (alien cover resulting from disturbance is generally more difficult to restore than infestation of undisturbed sites).
- The condition of the site in terms of current or previous land uses.

In terms of **process**, the following will be identified or described:

- The key ecological "drivers" of ecosystems on the site and in the vicinity, such as fire.
- Any mapped spatial component of an ecological process that may occur at the site or in its vicinity (i.e. *corridors* such as watercourses, upland-lowland gradients, migration routes, coastal linkages or inland-trending dunes, and *vegetation boundaries* such as edaphic interfaces, upland-lowland interfaces or biome boundaries)
- Any possible changes in key processes, e.g. increased fire frequency or drainage/artificial recharge of aquatic systems.
- Furthermore, any further studies that may be required during or after the EIA process will be outlined.
- All relevant legislation, permits and standards that would apply to the development will be identified.
- The opportunities and constraints for development will be described and shown graphically on an aerial photograph, satellite image or map delineated at an appropriate level of spatial accuracy.

1.3 RELEVANT ASPECTS OF THE DEVELOPMENT

The proposed development site is located south of Copperton on Farm 147, Humansrus with a total farm area of 4769 ha.

The development will consist of the following:

- The proposed facility is planned and designed with a net generating capacity (AC) of 75MWp, with an installed capacity (DC) of +/-90MWp.

Two alternatives have been identified for the assessment up to 240ha in extent.

Infrastructure associated with the facility is likely to include:

» PV and/or concentrated PV with fixed, single or double axis tracking technology. The actual technology to be used will be decided at a later date.

- A single grid connection option to the Kronos substation is included.
- Auxiliary buildings of approximately 2ha. The functions within these buildings include (but is not limited to) to ablution, workshops, storage areas and site offices. Fencing height shall be below 5m.
- Access roads are expected to be 6m in width, but less than 8m in width. The length of these access roads are dependent on the specific scenarios, as depicted within the layouts. As the site is adjacent to the R357, the length of such access roads will be low and restricted to the site.
- Approximately 2-5ha of laydown area will be required, but will not exceed 5ha.

Figure 1. Satellite image of the Humansrus Solar 3 site, illustrating the proposed development alternatives, with the preferred alternative in red and the alternative in blue, divided into two parts split by the R357 with the grid connection to Kronos in purple.

2 METHODOLOGY

2.1 DATA SOURCING AND REVIEW

Data sources from the literature consulted and used where necessary in the study includes the following:

Vegetation:

- Vegetation types and their conservation status were extracted from the South African National Vegetation Map (Mucina & Rutherford 2006) as well as the National List of Threatened Ecosystems (2011), where relevant.
- No Critical Biodiversity Areas (CBA) mapping or systematic conservation planning has been conducted for the area with the result that no detailed conservation priority area information is available for the area.
- Information on plant and animal species recorded for the Quarter Degree Square (QDS) 2922 CD and DC, 3022 AB and BA was extracted from the SABIF/SIBIS database hosted by SANBI. This is a considerably larger area than the study area, but this is necessary to ensure a conservative approach as well as counter the fact that the site itself or the immediate area has not been well sampled in the past.
- The IUCN conservation status (Table 1) of the species in the list was also extracted from the database and is based on the Threatened Species Programme, Red List of South African Plants (2014).
- Freshwater and wetland information was extracted from the National Freshwater Ecosystem Priority Areas assessment, NFEPA (Nel et al. 2011).
- Important catchments and protected areas expansion areas were extracted from the National Protected Areas Expansion Strategy 2008 (NPAES).

Fauna

- Lists of mammals, reptiles and amphibians which are likely to occur at the site were derived based on distribution records from the literature and various spatial databases (SANBI's SIBIS and BGIS databases).
- Literature consulted includes Branch (1988) and Alexander and Marais (2007) for reptiles, Du Preez and Carruthers (2009) for amphibians, Friedmann and Daly (2004) and Skinner and Chimimba (2005) for mammals.
- Apart from the literature sources, additional information on reptiles were extracted from the SARCA web portal, hosted by the ADU, http://vmus.adu.org.za
- The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.
- The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria version 2014.2 (See Figure 2) and where species have not been assessed under these criteria, the CITES status is reported where possible. These lists are adequate for mammals and amphibians, the majority of which have been assessed, however the majority of reptiles have not been assessed and therefore, it is not adequate to assess the potential impact of the development on reptiles, based on those with a listed conservation status alone. In order to address this shortcoming, the distribution of reptiles was also taken into account such that any narrow endemics or species with highly specialized habitat requirements occurring at the site were noted.

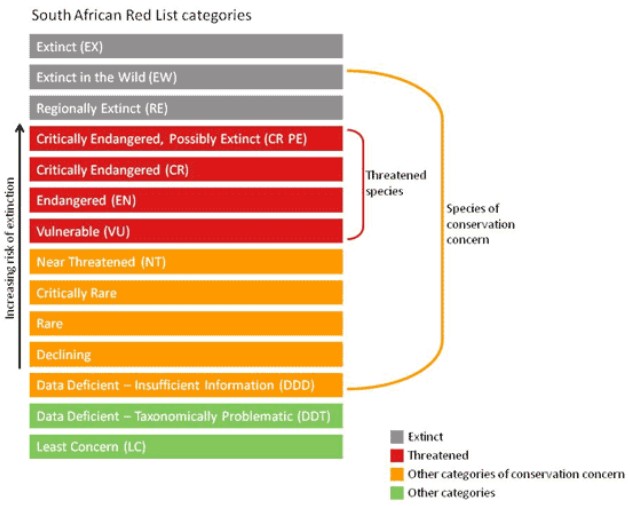

Figure 2. Schematic representation of the South African Red List categories. Taken from http://redlist.sanbi.org/redcat.php

2.2 SENSITIVITY MAPPING & ASSESSMENT

An ecological sensitivity map of the site was produced by integrating the available ecological and biodiversity information available in the literature and various spatial databases with mapping based on the satellite imagery of the site as well as personal knowledge of the site. This includes delineating different habitat units identified on the satellite imagery and assigning likely sensitivity values to the units based on their ecological properties, conservation value and the potential presence of species of conservation concern. The ecological sensitivity of the different units identified in the mapping procedure was rated according to the following scale:

- **Low** – Areas of natural or transformed habitat with a low sensitivity where there is likely to be a negligible impact on ecological processes and terrestrial biodiversity. Most types of development can proceed within these areas with little ecological impact.
- **Medium**- Areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. These areas usually comprise the bulk of habitats within an area. Development within these areas can proceed with relatively little ecological impact provided that appropriate mitigation measures are taken.
- **High** – Areas of natural or transformed land where a high impact is anticipated due to the high biodiversity value, sensitivity or important ecological role of the area. These areas may contain or be important habitat for faunal species or provide important ecological services such as water flow regulation or forage provision. Development within these areas is undesirable and should only proceed with caution as it may not be possible to mitigate all impacts appropriately.
- **Very High** – Critical and unique habitats that serve as habitat for rare/endangered species or perform critical ecological roles. These areas are essentially no-go areas from a developmental perspective and should be avoided as much as possible.

In some situations, areas were also classified between the above categories, such as Medium-High, where it was deemed that an area did not fit well into a certain category but rather fell most appropriately between two sensitivity categories.

2.3 SAMPLING LIMITATIONS AND ASSUMPTIONS

The current study is based on a desktop analysis, as well as a site visit and field assessment for a solar development in the same area as the current development. As such, the results provided and the description of features present and the sensitivity map are validated by field data. Although no site visit for this study took place, the site visit for the previous assessment took place in early summer, but it was still dry at the site and majority of species were not actively growing. However, the area has been visited on numerous occasions by the consultant in the past for a variety of different assessments, several of which included the current property as part of their study area. As a result, the area has been observed during different seasons and the consultant is familiar with the different ecological patterns and features that are present in the area. Although it is likely that some geophytes and forbs are present at the site that were dormant at the time of the current site visit and have therefore not been recorded, the majority of perennial plants present were sufficiently active that they could be identified and it is unlikely that there are any significant vegetative features present that would not have been observed during the site visit. Consequently, the timing of the site visit is not considered to be a limiting factor which might compromise the results in any way.

The lists of amphibians, reptiles and mammals for the site are based on those observed at the site as well as those likely to occur in the area based on their distribution and habitat preferences. This represents a sufficiently conservative and cautious approach which takes the study limitations into account.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT- BASELINE

3.1 BROAD-SCALE VEGETATION PATTERNS

According to the national vegetation map (Mucina & Rutherford 2006), the site straddles two vegetation types, Bushmanland Arid Grassland in the east and Bushmanland Basin Shrubland in the west. These are both extensive vegetation types that have not been impacted to a large degree by transformation and are classified as Least Threatened.

Bushmanland Arid Grassland is the second most extensive vegetation type in South Africa and occupies an area of 45 478 km^2 and extends from around Aggeneys in the west to Prieska in the east. It is associated largely with red-yellow apedal (without structure), freely drained soils, with a high base status and mostly less than 300 mm deep. Due the arid nature of the unit which receives between 70 and 200 mm annual rainfall, it has not been significantly impacted by intensive agriculture and more than 99% of the original extent of the vegetation type is still intact and its' conservation status is classified as Least Threatened. Mucina and Rutherford (2006) list 6 endemic species for the vegetation type which is relatively few given the extensive nature of the vegetation type.

Bushmanland Basin Shrubland is also among the most extensive vegetation types in South Africa with an extent of 34 690 km^2. Bushmanland Basin Shrubland occurs on the extensive basin centered on Brandvlei and Van Wyksvlei, spanning Granaatboskolk in the west to Copperton in the east, and Kenhardt in the north to around Williston in the south. The area is characterized by slightly irregular plains dominated by dwarf woody shrubs, with succulent shrubs or perennial grasses in places. The geology consists largely of mudstones and shales of the Ecca group and Dwyka tillites with occasional dolerite intrusions. Soils are largely shallow to non-existent, with calcrete present in most areas. Rainfall ranges from 100-200mm and falls mostly during the summer months as thunder storms. As a result of the arid nature of the area, very little of this vegetation type has been affected by intensive agriculture and it is classified as Least Threatened. There are few endemic and biogeographically important species present within this vegetation unit and only *Tridentea dwequensis* is listed by Mucina and Rutherford (2006) as biogeographically important while *Cromidon minimum*, *Ornithogalum bicornutum* and *O.ovatum* subsp *oliverorum* are listed as being endemic to the vegetation type.

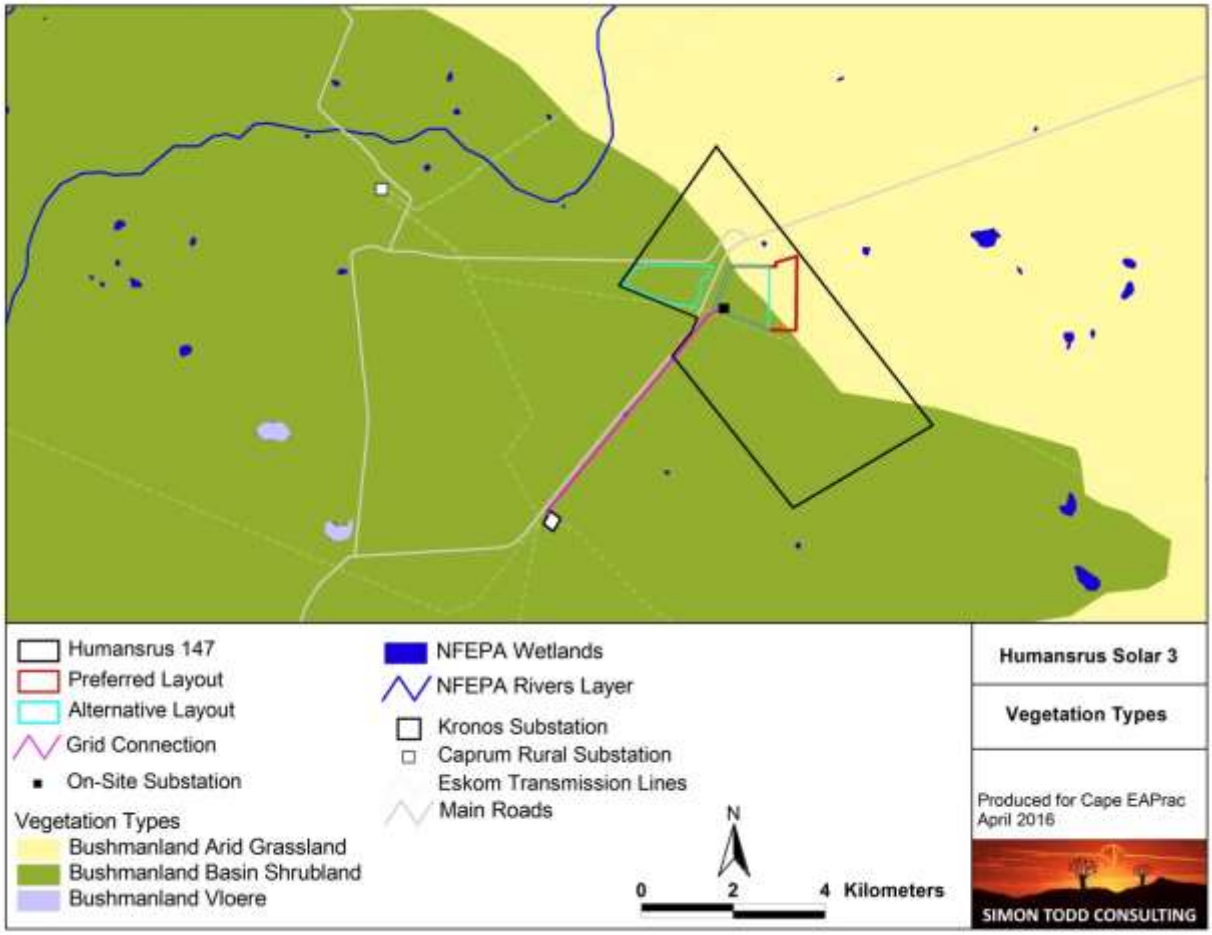

Figure 3. Broad-scale overview of the vegetation in and around the Humansrus Solar 3 site. The vegetation map is an extract of the national vegetation map as produced by Mucina and Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

The vegetation of the site is homogenous and there is not a lot of variation across the site and there are no features of high sensitivity within the proposed development alternatives. Common and dominant species include *Zygophyllum lichtensteinianum*, *Lycium cinereum*, *Hermannia spinosa*, *Pteronia sordid*a, *Pteronia inflexa*, *Pteronia glomerata*, *Eriocephalus microphyllus* var. *pubescens*, *Pentzia incana*, *Ruschia spinosa*, *Aptosimum marlothii*, *Rosenia humilis* and *Pegolettia retrofracta, Ruschia divaricata*, *Salsola tuberculata*, *Osteospermum armatum, Lycium cinereum*, *Plinthus karooicus* and *Aristida adscensionis*. Although most of the site consists of low shrubland, there are some occasional larger species such as *Phaeoptilum spinosum*, *Lycium horridum* and *Rhigozum trichotomum* scattered about the site. Although the majority of the site is dominated by low karoo shrubs, there is a variety of grasses present including *Stipgrostis obtusa*, *Enneapogon desvauxii*, *Stipagrostis ciliata* and *Eragrostis lehmanianna*.

Figure 4. The Humansrus Solar 3 study area south of the Eskom power line which traverses the site. The vegetation consists of a low dwarf shrubland and grassy vegetation is only present along the northeastern margin of the site.

3.2 LISTED AND PROTECTED PLANT SPECIES

According to the SIBIS database, only two red data-listed plant species are known from the area, *Hoodia gordonii* which is listed as DDD (data deficient, insufficient information) and *Salsola apiciflora* which is listed DDT (Data Deficient – Taxonomically Problematic). There are however a variety of nationally or provincially protected species present in the area which have been observed during previous site visits to the area. Perhaps the most common is the nationally protected tree species *Boscia albitrunca* which is common in the rocky hills of the area but was not observed within the site. *Harpagophytum procumbens* was also observed within the broader area, but is associated with red sands and would not occur within the site. Other protected species observed during previous studies in the area include *Hoodia gordonii*, *Hoodia flava*, *Lithops halli*, *Titanopsis calcarea*, *Pachypodium succulentum*, *Mestoklema tuberosum*, *Aloe claviflora*, *Avonia ustulata* and *Boscia foetida*. Of these only *Titanopsis calcarea* was observed at the site and is a calcrete specialist prevalent in areas of exposed calcrete such as occur at the site. The density of this species was however low and large numbers would not be impacted.

3.3 CRITICAL BIODIVERSITY AREAS & BROAD-SCALE PROCESSES

No fine-scale conservation planning has been conducted for the region and as a result, no Critical Biodiversity Areas have been defined for the study area. In terms of other broad-scale planning studies, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region.

Due to the large number of developments in the area the potential for cumulative impacts is high. A map of all the DEA-registered renewable energy developments in the area is depicted in Figure 5 below and illustrates the current development site surrounded by other renewable energy developments. Several of these are already constructed or currently under construction. As a result, a cluster of development around the Kronos substation is developing and is likely to increase going forward. However, the area is considered to be of generally low sensitivity and it is not likely that the area is important for faunal movement or migration. In addition, the wider area is still largely intact and the cumulative impact on transformation of the affected vegetation types would be low. As a result, despite the potential for cumulative impact in the area, it is not currently considered to be highly significant.

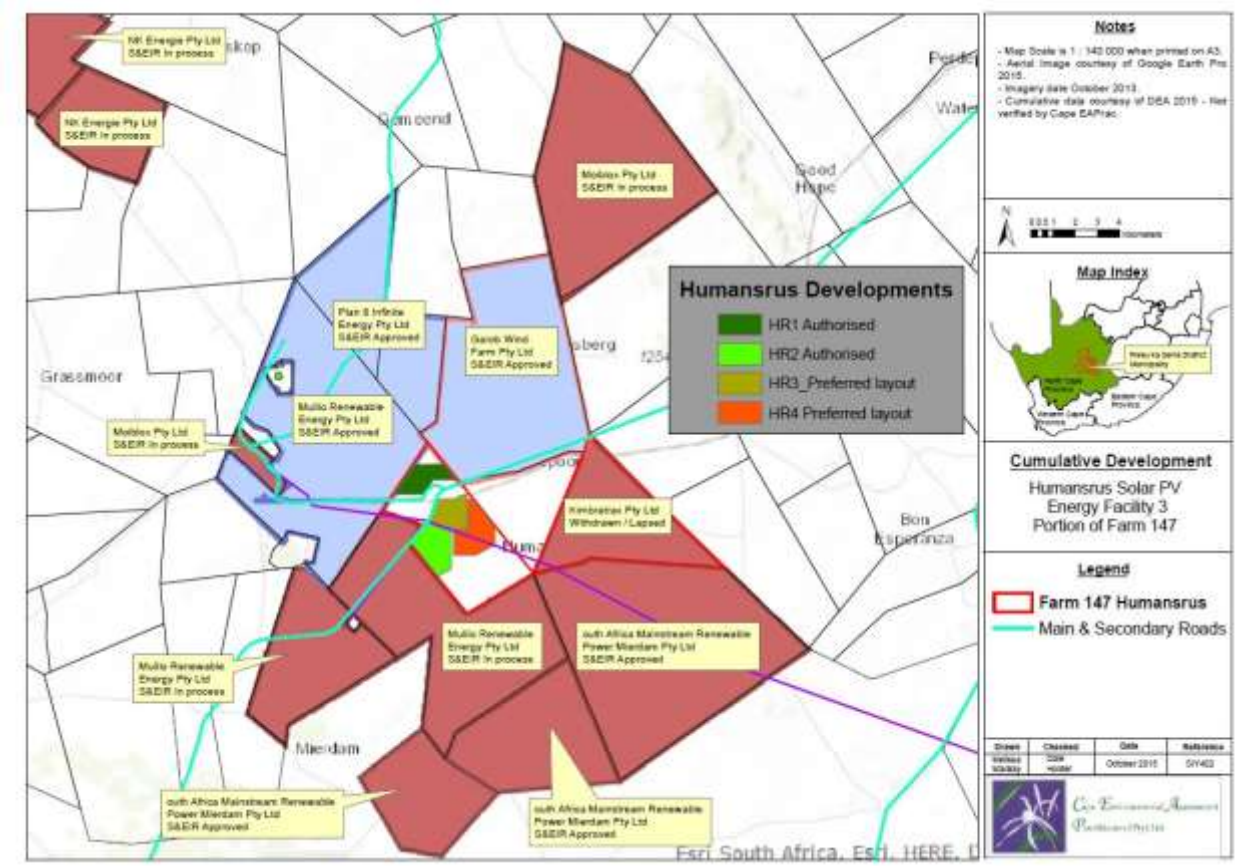

Figure 5. Map of DEA-registered renewable energy projects around the Humansrus site, showing the high density of the development in the area, which is driven by the presence of the Kronos and Cuprum substations.

3.4 FAUNAL COMMUNITIES

Mammals

The site lies within the range of approximately 43 terrestrial mammals, including four listed species. The listed species are the Black-footed cat *Felis nigripes* (VU) Brown Hyaena *Hyaena brunnea* (NT), South African Hedgehog *Atelerix frontalis* (NT) and Honey Badger *Mellivora capensis* (SA RDB EN). All of these species have a wide distribution in South Africa and the loss of about 200 ha of habitat would not result in significant habitat loss for these species considering that this is less than the home range of a single individual of any one of these species.

Faunal abundance in the area is quite high and a wide array of species has directly or indirectly been observed during the numerous previous site visits to the area. The majority of species that have been observed are medium sized mammals, typical of the area and no particularly rare or notable species were observed. Species that were observed in the area include Cape Porcupine *Hystrix africaeaustralis*, Steenbok *Raphicerus campestris*, Springbok *Antidorcas marsupialis*, Aardvark *Orycteropus afer*, Rock Hyrax *Procavia capensis*, Cape Hare *Lepus capensis*, South African Ground Squirrel *Xerus inauris*,

Namaqua Rock Mouse *Aethomys namaquensis*, Black-backed Jackal *Canis mesomelas*, Bat-eared Fox *Otocyon megalotis*, Yellow Mongoose *Cynictis penicillata* and African Wild Cat *Felis silvestris*.

Potential impacts on mammals are likely to be restricted largely to disturbance during the construction phase and habitat loss during the operational phase. Although this is relatively low in the context of the landscape, impacts on habitat fragmentation and landscape connectivity are likely to be increasingly significant as the landscape becomes increasingly transformed as a result of the large number of the developments in the area. There are however no reasons to expect that the affected area is of above average importance for landscape connectivity and is not likely to be within a corridor of specific importance for faunal movement or landscape connectivity.

Reptiles

According to the SARCA database only 30 species have been recoded within the quarter degree squares 2922CC, 2922CD, 2922DC, 3022AA, 3022AB, 3022BA, indicating that the reptile diversity in the broad area is relatively low. Species observed in the area previously included the Rock Monitor *Varanus albigularis*, Spotted Sand Lizard *Pedioplanis lineoocellata* and Burchell's Sand Lizard *Pedioplanis burchelii*. There are no rocky hills within the study area, and as a result, reptile diversity within the study area is likely to be low. Only one listed species is known from the broad area, the Karoo Padloper *Homopus boulengeri* (Near Threatened). Although this species may be present, it was not observed during the previous site visits and has not been recorded during SARCA surveys either and if it occurs in the area, would be present at a low density.

In terms of the likely impact of the development on reptiles, habitat loss is likely to be of local significance only due to the relatively low footprint of the development and the relatively low reptile diversity of the site. Furthermore, many species would be able to use the vegetation under the panels and some species would take advantage of the buildings and structures present. Some transient disturbance of reptiles during construction is likely due to disturbance and vegetation clearing. Overall, as there are few range-restricted or listed reptile species at the site, impacts on reptiles from the development is likely to be local in nature and not of broader significance.

Amphibians

Although 11 frog species are known from the broad area around the site, frog diversity within the site is likely to be low. There is no perennial water or pans in the site and the drainage lines are not sufficiently well developed to offer any breeding habitat for amphibians. Species which may occur on the site are those which are relatively independent of perennial water such as the Karoo Toad *Vandijkophrynus gariepensis*, Common Caco *Cacosternum boettgeri* and Tandy's Sand Frog *Tomopterna tandyi*. Only one listed species is known from the area, the Giant Bullfrog *Pyxicephalus adpersus* which is listed as Near Threatened. This species breeds in ephemeral pans and there are not any suitable pans for this species within the affected area. Given the low likely abundance of frogs at the site, impacts on frogs are likely to be relatively low, but apart from disturbance, pollution is highlighted as a potential impact source for frogs.

3.5 SITE SENSITIVITY ASSESSMENT

The sensitivity map for the proposed development areas of the Humansrus Solar 3 site is illustrated below in Figure 6. There are no highly sensitive features identified within the site that would be affected by the development. The site is homogenous and there are no rocky hills or large drainage systems of higher sensitivity status. There are not many trees on the site, which suggests that it is unlikely that the development will impact more than a handful of any protected trees species. There are some areas of exposed gravels within the site and these may contain species of conservation concern such as *Lithops* or *Titanopsis* but only the latter was observed in the area during the site visit and it is not likely that *Lithops* are present. There are no areas of specific importance identified for terrestrial fauna within the study area as it is generally homogenous. There are some drainage features along the southern boundary of the study area, but these are outside of the development footprint and would not be affected. There is little difference between the two development alternatives and as a result, both are considered to generate similar impact and the preferred alternative of the developer, is considered acceptable and the early stage avoidance implemented by the developer is an important action which has led to the low likely impacts associated with the development.

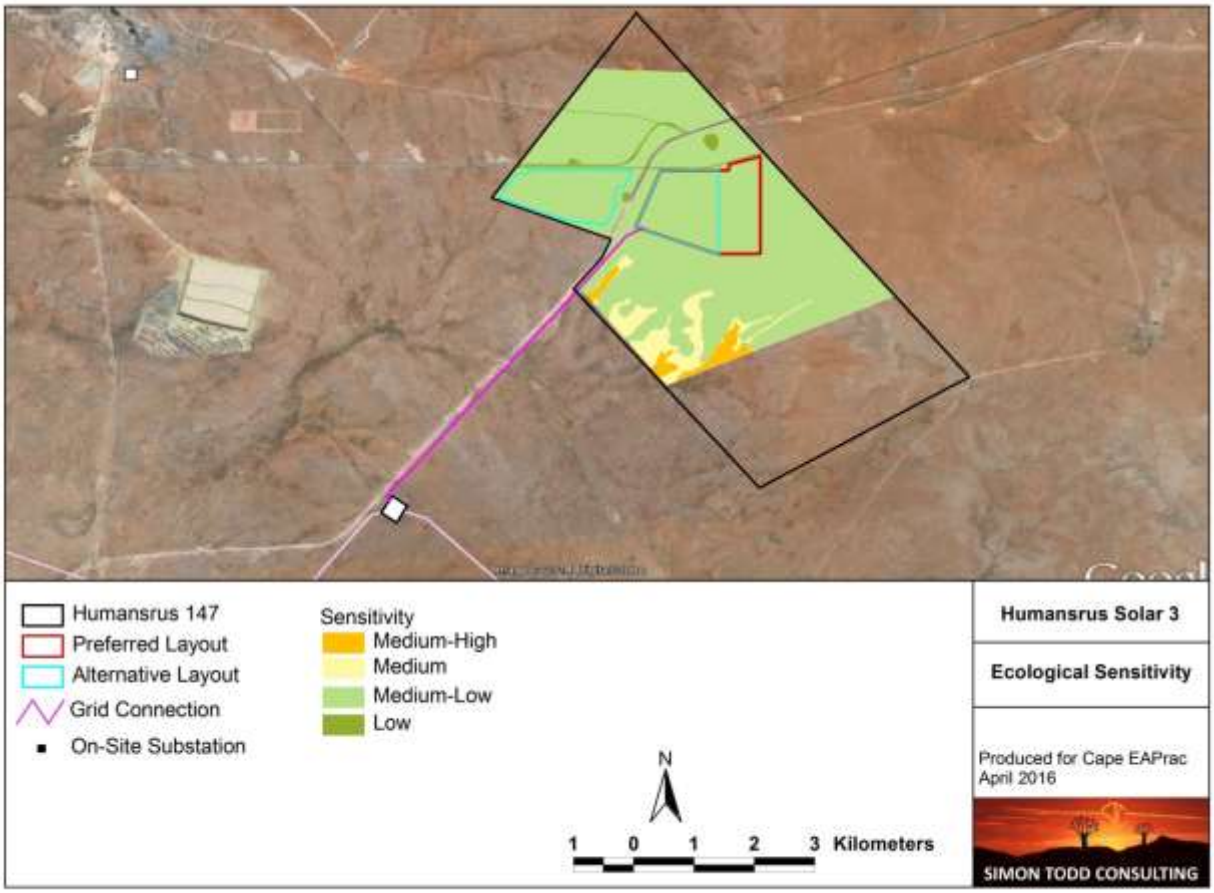

Figure 6. Ecological sensitivity map of the Humansrus Solar 3 site, showing that the majority of the site consists of the natural vegetation of low sensitivity.

4 IDENTIFICATION & NATURE OF IMPACTS

In this section, the potential impacts and associated risk factors that may be generated by the development are identified. In order to ensure that the impacts identified are broadly applicable and inclusive, all the likely or potential impacts that may be associated with the development are listed. The relevance and applicability of each potential impact to the current situation are then examined in more detail in the next section.

4.1 IDENTIFICATION OF POTENTIAL IMPACTS AND DAMAGING ACTIVITIES

Potential ecological impacts resulting from the development of the Humansrus Solar 3 Facility would stem from a variety of different activities and risk factors associated with the preconstruction, construction and operational phases of the project including the following:

Preconstruction Phase

- Human presence and uncontrolled access to the site may result in negative impacts on fauna and flora through poaching of fauna and uncontrolled collection of plants for traditional medicine or other purpose.
- Site clearing and exploration activities for site establishment would have a negative impact on biodiversity if this was not conducted in a sensitive manner.

Construction Phase

- Vegetation clearing for the PV arrays, access roads, site fencing etc could impact listed plant species as well as high-biodiversity plant communities. Vegetation clearing will also lead to habitat loss for fauna and avifauna and potentially the loss of sensitive faunal species, habitats and ecosystems.
- Increased erosion risk would occur due to the loss of plant cover and soil disturbance created during the construction phase. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems.
- Presence and operation of construction machinery on site. This will create a physical impact as well as generate noise, pollution and other forms of disturbance at the site.
- Increased human presence can lead to poaching, illegal plant harvesting and other forms of disturbance such as fire.

Operational Phase

- The operation of the facility will generate noise and disturbance which may deter some fauna and avifauna from the area.
- The areas inside the facility will require management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.

Cumulative Impacts

- The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets.
- Transformation of intact habitat would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.

4.2 IDENTIFICATION OF IMPACTS TO BE ASSESSED

The development will result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat to hard infrastructure such as roads, PV areas, operations buildings etc. The following impacts are identified as those most likely to be associated with the development and which are assessed for the different phases of the project as appropriate.

Impacts on vegetation and protected plant species

There are a number of listed and protected species present in the area and some confirmed protected species within the development area and it is highly likely that some of these would be impacted by the development. Vegetation clearing during construction will lead to the loss of currently intact habitat within the development footprint and is an inevitable consequence of the development. As this impact is certain to occur it is assessed for the construction phase as this is when clearing will take place.

Soil erosion and associated degradation of ecosystems

The large amount of disturbance created during construction would potentially leave the site vulnerable to soil erosion. The site is gently sloping and disturbance leading to the loss of plant cover over large parts of the site will certainly increase the risk of wind and water erosion at the site. In addition, the panels will generate a lot more runoff than the natural vegetation would and as a result the amount of runoff the site experiences would be likely to increase. Soil erosion is therefore considered a likely impact and is assessed for the construction phase.

Direct Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some impact on fauna is highly likely to occur during construction as well as operation and this impact is therefore assessed for the construction phase and operational phase.

Alien Plant Invasion

The disturbance created during construction is highly likely to encourage the invasion of the disturbed areas by alien species. Although there are not a lot of alien species present within the undisturbed parts of the site, there were some aliens present in disturbed areas such as around

watering points. This includes woody invaders such as *Prosopis glandulosa*. Such species will rapidly increase in abundance and expand into the disturbed areas if given the opportunity. This impact is deemed highly likely to occur and is assessed as a likely impact associated with the development.

Reduced ability to meet conservation obligations & targets

The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the country's ability to meet its conservation targets. The receiving vegetation types in the study area are classified as Least Threatened and are still more than 98% intact. As these are widespread vegetation types and there is no indication that there are any rare or restricted habitats within the development footprint, this is not considered to be a high risk associated with the current development when considered at the scale of the vegetation type. In addition, there are no habitats within the development footprint that are not widely available in the area. Consequently, this is not considered to be an impact of significance and is not assessed.

Impact on broad-scale ecological processes

Transformation of intact habitat on a cumulative basis would contribute to the fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations. Due to the large amount of development in the area, this is a likely cumulative impact of the development that is assessed.

5 ASSESSMENT OF IMPACTS

The following assessed impacts are those for the solar facility itself, for the planning and construction and operational phases of the development. Although there are two development options, these are not considered significantly different from one another in terms of their likely impacts and so both are considered in a single assessment and they are not compared to one another.

5.1 PLANNING & CONSTRUCTION PHASE

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Impacts on vegetation and listed or protected plant species resulting from construction activities	Local	Long-Term	High	Definite	Low	Medium Negative	Medium-Low Negative	High
Mitigation/Management Actions • Preconstruction walk-through of the facility in order to locate species of conservation concern that can be translocated as well as comply with the Northern Cape Nature Conservation Act and DENC/DAFF permit conditions. • Vegetation clearing to commence only after walk through has been conducted and necessary permits obtained. • Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. • Eco to provide supervision and oversight of vegetation clearing activities within sensitive areas such as near drainage areas. • Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared. • All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed outside of the construction area. • Temporary lay-down areas should be located within previously transformed areas or areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.								
Direct Faunal Impacts During Construction	Local	Short- Term	Medium	High	High	Medium Negative	Medium-Low Negative	High
Mitigation/Management Actions • All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. • Any fauna threatened by the construction activities should be removed to safety by the ECO or appropriately qualified environmental officer. • All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.								

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
• If trenches need to be dug for water pipelines or electrical cabling, these should not be left open for extended periods of time as fauna may fall in and become trapped in them. Trenches which are standing open should have places where there are soil ramps allowing fauna to escape the trench.								
Soil Erosion Risk During Construction	Local	Medium-term	Medium-High	High	Low	Medium-Low Negative	Low Negative	High
Mitigation/Management Actions • Dust suppression and erosion management should be an integrated component of the construction approach. • Disturbance near to drainage lines should be avoided and sensitive drainage areas near to the construction activities should demarcated as no-go areas. • Regular monitoring for erosion problems along the access roads and other cleared areas. • Erosion problems should be rectified on a regular basis. • Sediment traps may be necessary to prevent erosion and soil movement if there are topsoil or other waste heaps present during the wet season. • A low cover of vegetation should be left wherever possible within the construction footprint to bind the soil, prevent erosion and promote post-disturbance recovery of an indigenous ground cover.								

5.2 OPERATIONAL PHASE

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Alien Plant Invasion Risk During Operation	Local	Long-term	Medium-High	High	Low	Medium Negative	Low Negative	High
Mitigation/Management Actions • Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. • The recovery of the indigenous vegetation should be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent cleared areas. • Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. • Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as these are also likely to be prone to invasion problems. • Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.								

Soil Erosion Risk During Operation	Local	Long-term	Medium-High	High	Low	Medium Negative	Low Negative	High
Mitigation/Management Actions • All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. • Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. • All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. • All cleared areas should be revegetated with indigenous perennial grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow.								
Faunal impacts during operation:	Low	Long-term	Medium	Moderate	High	Medium-Low Negative	Low-Negative	High
Mitigation/Management Actions • No unauthorized persons should be allowed onto the site. • Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location. • The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. • If the site must be lit at night for security purposes, this should be done with downward-directed low-UV type lights (such as most LEDs), which do not attract insects. • All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. • All vehicles accessing the site should adhere to a low speed limit (30km/h max) to avoid collisions with susceptible species such as snakes and tortoises. • If the facility is to be fenced, then the electrified strands should be on the inside of the fence as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour by retreating into their shells and are killed by repeated shocks.								

5.3 CUMULATIVE IMPACTS

The following are the cumulative impacts that are assessed as being a likely consequence of the development.

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat	Regional	Long-Term	Medium	Moderate	Low	Medium-Low Negative	Low Negative	Moderate-High
Mitigation/Management Actions • Minimise the development footprint as far as possible and allow the retention of some natural vegetation between the rows of panels or trackers. • The facility should be fenced off in a manner which allows fauna to pass by the facility as easily as possible. This implies not fencing-in large areas of intact vegetation into the facility and only								

Nature of impact	Spatial Extent	Duration	Intensity	Probability	Reversibility	Significance and Status		Confidence level
						Without Mitigation	With Mitigation	
the developed area should be fenced.								

6 CONCLUSION & RECOMMENDATIONS

The Humansrus Solar 3 site consists of low open shrubland with few species of conservation concern present. There are no features of high sensitivity within the site and it is considered low-moderate sensitivity. The abundance of fauna and flora of conservation concern at the site is low and the affected habitat types are widely available in the area and would not be significantly impacted by the current development or on a cumulative basis from the wider area. As a result, the impacts associated with the development of the Humansrus Solar 3 site would be local in nature and not of high significance after mitigation.

The major impacts associated with the development of the Humansrus Solar 3 solar energy facility would be local habitat loss and the disruption of landscape connectivity. As there are a number of other approved and proposed renewable energy projects in the area, the potential for cumulative impacts is high. However, the total extent of habitat loss in the area to date is less than 500ha and this is not considered highly significant in context of the surrounding landscape which is still largely intact. In addition, it is not likely that the affected area is highly significant for faunal movement or migration.

There are no impacts associated with the development that cannot be mitigated to a low level and as a result, the site is considered to be a favourable location for the development. A summary assessment of the different impacts associated with the development is provided below and indicates that the largest proportion of impact associated with the development would occur at the construction stage, due the disturbance of fauna and loss or transformation of vegetation that will occur at this phase of development. Overall the site is considered favourable for development and the development itself is within the least sensitive part of the site and this is key driver of the overall low assessed impact of the development.

Summary table of the impacts likely to be associated with the development of the Humansrus Solar 3 project.

Phase & Impact	**Without Mitigation**	**With Mitigation**
Planning & Construction		
Impacts on vegetation and listed or protected plant species resulting from construction activities	Medium Negative	Medium-Low Negative
Direct Faunal Impacts During Construction	Medium Negative	Medium-Low Negative
Soil Erosion Risk During Construction	Medium-Low Negative	Low Negative
Operation		
Alien Plant Invasion Risk During Operation	Medium Negative	Low Negative
Soil Erosion Risk During Operation	Medium Negative	Low Negative
Faunal impacts during operation:	Medium-Low Negative	Low-Negative
Cumulative Impacts		
Impact on broad-scale ecological processes due to cumulative loss and fragmentation of habitat	Medium-Low Negative	Low Negative

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8 ANNEX 1. LIST OF MAMMALS

List of mammals which are likely to occur in the vicinity of the Humansrus Solar 3 site. Habitat notes and distribution records are based on Skinner & Chimimba (2005), while conservation status is from the IUCN Red Lists 2014.2 and South African Red Data Book for Mammals. Confirmed species are those observed in the area, not necessarily from the site itself.

Scientific Name	Common Name	Status	Habitat	Likelihood
Macroscledidea (Elephant Shrews):				
Macroscelides proboscideus	Round-eared Elephant Shrew	LC	Species of open country, with preference for shrub bush and sparse grass cover, also occur on hard gravel plains with sparse boulders for shelter, and on loose sandy soil provided there is some bush cover	High
Elephantulus rupestris	Western Rock Elephant Shrew	LC	Rocky koppies, rocky outcrops or piles of boulders where these offer sufficient holes and crannies for refuge.	High
Tubulentata:				
Orycteropus afer	Aardvark	LC	Wide habitat tolerance, being found in open woodland, scrub and grassland, especially associated with sandy soil	Confirmed
Hyracoidea (Hyraxes)				
Procavia capensis	Rock Hyrax	LC	Outcrops of rocks, especially granite formations and dolomite intrusions in the Karoo. Also erosion gullies	Confirmed
Lagomorpha (Hares and Rabbits):				
Lepus capensis	Cape Hare	LC	Dry, open regions, with palatable bush and grass	Confirmed
Lepus saxatilis	Scrub Hare	LC	Common in agriculturally developed areas, especially in crop-growing areas or in fallow lands where there is some bush development.	High
Rodentia (Rodents):				
Cryptomys hottentotus	African Mole Rat	LC	Wide diversity of substrates, from sandy soils to heavier compact substrates such as decomposed schists and stony soils	Confirmed
Hystrix africaeaustralis	Cape Porcupine	LC	Catholic in habitat requirements.	Confirmed
Pedetes capensis	Springhare	LC	Occur widely on open sandy ground or sandy scrub, on overgrazed grassland, on the fringes of vleis and dry river beds.	High
Xerus inauris	South African Ground Squirrel	LC	Open terrain with a sparse bush cover and a hard substrate	Confirmed
Graphiurus ocularis	Spectacled Dormouse	LC	Associated with sandstones of Cape Fold mountains, which have many vertical and horizontal crevices.	High
Rhabdomys pumilio	Four-striped Grass Mouse	LC	Essentially a grassland species, occurs in wide variety of habitats where there is good grass cover.	High
Mus minutoides	Pygmy Mouse	LC	Wide habitat tolerance	High
Mastomys coucha	Southern Multimammate Mouse	LC	Wide habitat tolerance.	High
Aethomys namaquensis	Namaqua Rock Mouse	LC	Catholic in their habitat requirements, but where there are rocky koppies, outcrops or boulder-strewn hillsides they use these preferentially	Confirmed
Parotomys brantsii	Brants' Whistling Rat	LC	Associated with a dry sandy substrate in more arid parts of the Nama-karoo and Succulent Karoo. Species selects areas of low percentage of plant	High

			cover and areas with deep sands.	
Parotomys littledalei	Littledale's Whistling Rat	LC	Riverine associations or associated with Lycium bushes or Psilocaulon absimile	High
Otomys unisulcatus	Bush Vlei Rat	LC	Shrub and fynbos associations in areas with rocky outcrops Tend to avoid damp situations but exploit the semi-arid Karoo through behavioural adaptation.	Low
Desmodillus auricularis	Cape Short-tailed Gerbil	LC	Tend to occur on hard ground, unlike other gerbil species, with some cover of grass or karroid bush	High
Gerbillurus paeba	Hairy-footed Gerbil	LC	Gerbils associated with Nama and Succulent Karoo preferring sandy soil or sandy alluvium with a grass, scrub or light woodland cover	High
Gerbilliscus leucogaster	Bushveld Gerbil	LC	Predominantly associated with light sandy soils or sandy alluvium	Low
Gerbilliscus brantsii	Higheld Gerbil	LC	Sandy soils or sandy alluvium with some cover of grass, scrub or open woodland	Low
Malacothrix typica	Gerbil Mouse	LC	Found predominantly in Nama and Succulent Karoo biomes, in areas with a mean annual rainfall of 150-500 mm.	High
Primates:				
Papio ursinus	Chacma Baboon	LC	Can exploit fynbos, montane grasslands, riverine courses in deserts, and simply need water and access to refuges.	High
Eulipotyphla (Shrews):				
Crocidura cyanea	Reddish-Grey Musk Shrew	LC	Occurs in relatively dry terrain, with a mean annual rainfall of less than 500 mm. Occur in karroid scrub and in fynbos often in association with rocks.	High
Erinaceomorpha (Hedgehog)				
Atelerix frontalis	South African Hedgehog	LC	Generally found in semi-arid and subtemperate environments with ample ground cover	Low
Carnivora:				
Proteles cristata	Aardwolf	LC	Common in the 100-600mm rainfall range of country, Nama-Karoo, Succulent Karoo Grassland and Savanna biomes	High
Caracal caracal	Caracal	LC	Caracals tolerate arid regions, occur in semi-desert and karroid conditions	High
Felis silvestris	African Wild Cat	LC	Wide habitat tolerance.	Confirmed
Felis nigripes	Black-footed cat	VU	Associated with arid country with MAR 100-500 mm, particularly areas with open habitat that provides some cover in the form of tall stands of grass or scrub.	High
Genetta genetta	Small-spotted genet	LC	Occur in open arid associations	High
Suricata suricatta	Meerkat	LC	Open arid country where substrate is hard and stony. Occur in Nama and Succulent Karoo but also fynbos	High
Cynictis penicillata	Yellow Mongoose	LC	Semi-arid country on a sandy substrate	Confirmed
Herpestes pulverulentus	Cape Grey Mongoose	LC	Wide habitat tolerance	High
Vulpes chama	Cape Fox	LC	Associated with open country, open grassland, grassland with scattered thickets and coastal or semi-desert scrub	High
Canis mesomelas	Black-backed Jackal	LC	Wide habitat tolerance, more common in drier areas.	Confirmed

Otocyon megalotis	Bat-eared Fox	LC	Open country with mean annual rainfall of 100-600 mm	Confirmed
Ictonyx striatus	Striped Polecat	LC	Widely distributed throughout the sub-region	Confirmed
Mellivora capensis	Ratel/Honey Badger	IUCN LC/SA RDB EN	Catholic habitat requirements	High
Rumanantia (Antelope):				
Oryx gazella	Gemsbok	LC	Open arid country	Confirmed
Sylvicapra grimmia	Common Duiker	LC	Presence of bushes is essential	High
Antidorcas marsupialis	Springbok	LC	Arid regions and open grassland.	Confirmed
Raphicerus campestris	Steenbok	LC	Inhabits open country,	Confirmed

9 ANNEX 2. LIST OF REPTILES

List of reptiles which are likely to occur at the proposed Humansrus Solar 3 site, based on the SARCA database. Conservation status is from the SARCA 2014 Assessment.

Family	Genus	Species	Subspecies	Common name	Red list category	No. records
Agamidae	*Agama*	*aculeata*	*aculeata*	Common Ground Agama	Least Concern	4
Agamidae	*Agama*	*anchietae*		Anchieta's Agama	Least Concern	5
Colubridae	*Boaedon*	*capensis*		Brown House Snake	Least Concern	3
Colubridae	*Dasypeltis*	*scabra*		Rhombic Egg-eater	Least Concern	1
Colubridae	*Psammophis*	*namibensis*		Namib Sand Snake	Least Concern	1
Colubridae	*Psammophis*	*notostictus*		Karoo Sand Snake	Least Concern	3
Colubridae	*Telescopus*	*beetzii*		Beetz's Tiger Snake	Least Concern	2
Cordylidae	*Karusasaurus*	*polyzonus*		Karoo Girdled Lizard	Least Concern	3
Gekkonidae	*Chondrodactylus*	*angulifer*	*angulifer*	Common Giant Ground Gecko	Least Concern	5
Gekkonidae	*Chondrodactylus*	*bibronii*		Bibron's Gecko	Least Concern	14
Gekkonidae	*Pachydactylus*	*capensis*		Cape Gecko	Least Concern	4
Gekkonidae	*Pachydactylus*	*latirostris*		Quartz Gecko	Least Concern	6
Gekkonidae	*Pachydactylus*	*rugosus*		Common Rough Gecko	Least Concern	5
Gekkonidae	*Ptenopus*	*garrulus*	*maculatus*	Spotted Barking Gecko	Least Concern	6
Lacertidae	*Heliobolus*	*lugubris*		Bushveld Lizard	Least Concern	1
Lacertidae	*Nucras*	*tessellata*		Western Sandveld Lizard	Least Concern	1
Lacertidae	*Pedioplanis*	*inornata*		Plain Sand Lizard	Least Concern	3
Lacertidae	*Pedioplanis*	*lineoocellata*	*lineoocellata*	Spotted Sand Lizard	Least Concern	39
Lacertidae	*Pedioplanis*	*namaquensis*		Namaqua Sand Lizard	Least Concern	9
Scincidae	*Acontias*	*lineatus*		Striped Dwarf Legless Skink	Least Concern	1
Scincidae	*Trachylepis*	*capensis*		Cape Skink	Least Concern	2
Scincidae	*Trachylepis*	*occidentalis*		Western Three-striped Skink	Least Concern	6
Scincidae	*Trachylepis*	*sparsa*		Karasburg Tree Skink	Least Concern	1
Scincidae	*Trachylepis*	*spilogaster*		Kalahari Tree Skink	Least Concern	2
Scincidae	*Trachylepis*	*sulcata*	*sulcata*	Western Rock Skink	Least Concern	6
Scincidae	*Trachylepis*	*variegata*		Variegated Skink	Least Concern	17
Testudinidae	*Psammobates*	*tentorius*	*verroxii*	Verrox's Tent	Not listed	12
						32

				Tortoise		
Testudinidae	*Stigmochelys*	*pardalis*		Leopard Tortoise	Least Concern	1
Typhlopidae	*Rhinotyphlops*	*lalandei*		Delalande's Beaked Blind Snake	Least Concern	1
Viperidae	*Bitis*	*arietans*	*arietans*	Puff Adder	Least Concern	1

10 ANNEX 3. LIST OF AMPHIBIANS

List of amphibians which are likely to occur in the vicinity of the Humansrus Solar 3 site, according to the Southern African Atlas of Frogs.

Family	Genus	Species	Common name	Red list category
Brevicepitidae	*Breviceps*	*adspersus*	Bushveld Rain Frog	Least Concern
Bufonidae	*Amietophrynus*	*gutturalis*	Guttural Toad	Least Concern
Bufonidae	*Amietophrynus*	*poweri*	Power's Toad	Least Concern
Bufonidae	*Amietophrynus*	*rangeri*	Raucous Toad	Least Concern
Bufonidae	*Poyntonophrynus*	*vertebralis*	Southern Pygmy Toad	Least Concern
Bufonidae	*Vandijkophrynus*	*gariepensis*	Karoo Toad	Least Concern
Pipidae	*Xenopus*	*laevis*	Common Platanna	Least Concern
Pyxicephalidae	*Amietia*	*angolensis*	Common or Angola River Frog	Least Concern
Pyxicephalidae	*Cacosternum*	*boettgeri*	Common Caco	Least Concern
Pyxicephalidae	*Pyxicephalus*	*adspersus*	Giant Bull Frog	Near Threatened
Pyxicephalidae	*Tomopterna*	*cryptotis*	Tremelo Sand Frog	Least Concern